

## FIRM SIZE AND ENTREPRENEURIAL CHARACTERISTICS: EVIDENCE FROM THE SME SECTOR IN ARGENTINA

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**Abstract.** This study investigates the determinants of firm size. Data was collected in face-to-face structured-questionnaire interviews of 1314 firm founders from 14 counties in Argentina. Quantile regression was used as a more suitable methodology to measure the determinants of firm size. Our results show that the main sets of explanatory variables related to founder characteristics (age, experience, education, and vocation) provide a full explanation of firm size. We have also found evidence that a high degree strategic planning and a better competitive position are positively related to firm size as well. Finally, environmental factors were less representative.

**Keywords:** growth, firm size, entrepreneurship's characteristics, regional development.

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### 1. Introduction

There is systematic empirical evidence that entrepreneurship is important for economic growth (e.g. Audretsch and Thurik 2000; Carree *et al.* 2002; Wennekers and Thurik 1999). Over the last several decades, new firm growth has become a popular research topic, especially since Birch (1979) found that new firms had created the majority of new employment in the U.S. In this respect, the SME sector's contribution to the economy has attracted the attention of academics and policy makers in both developed economies and those in transition (Krasniqi 2007).

The fact that entrepreneurs perform specialized functions that directly or indirectly contribute to output and growth is not a novel concept in the literature (Baumol 1968, 2004). As Salas and Sanchez (2006) mentioned, the list of entrepreneurial activities reported includes: innovation and creative destruction (Schumpeter, 1934; Acs and Audretsch 1990); the creation of new firms and the resulting increased competition (Nickell *et al.* 1997; Callejon and Segarra 1999); matching supply and demand (Kirzner 1979); input

co-ordination (Coase 1937); monitoring input quality in team production (Alchian and Demsetz 1972); and risk taking (Knight 1921; Kihlstrom and Laffont 1979).

The vast majority of studies have focused on the causes of firm growth in the U.S. and in the most developed countries in Europe. Evidence regarding the influence firms have on employment growth in developing countries, especially in Latin America, is still very scarce. In light of this shortcoming, the purpose of this study is to explore the factors influencing firm size of new and established firms in Argentina.

Why was Argentina special and what can we learn from it? According Perry and Serven (2003) Argentina outperformed most other economies in the region until 1997 in terms of growth per capita (see Table 1) in a relatively benign external environment, in spite of a short-lived interruption in 1995<sup>1</sup>. But after the major slowdown in growth in 1999 that affected the whole region, mainly due to capital flow retrenchment after the Russian crisis, other countries in the region began a modest recovery, while Argentina plunged into a protracted recession, reversing most of her previous gains at poverty reduction.

**Table 1.** Real GDP Growth Rate (Percentages)

Country	1991–97	1998	1999	2000–2001
Argentina	6.7	3.9	-3.4	-2.1
Bolivia	4.3	5.5	0.6	1.5
Brazil	3.1	0.2	0.8	3.1
Chile	8.3	3.9	-1.1	4.3
Colombia	4.0	0.5	-4.3	2.2
Costa Rica	4.9	8.4	8.2	1.3
Ecuador	3.2	0.4	-7.3	3.9
Mexico	2.9	4.9	3.8	3.3
Peru	5.3	-0.4	1.4	1.9
Venezuela	3.4	0.2	-6.1	3.3
Average	3.6	3.2	1.6	2.1

Source: World Development Indicators Database. World Bank (2010).

In this context, the bulk of papers are devoted to examine to which extent and why was the Argentine economy more vulnerable to adverse external shocks than other Latin American economies, and to what extent were policy mistakes the main culprit. In Roubini (2001), it examines the vulnerabilities associated with deflationary adjustments to shocks under a hard peg. In Sachs (2002) the focus is the public debt, the fragile fiscal position and the strength in the banking sector.

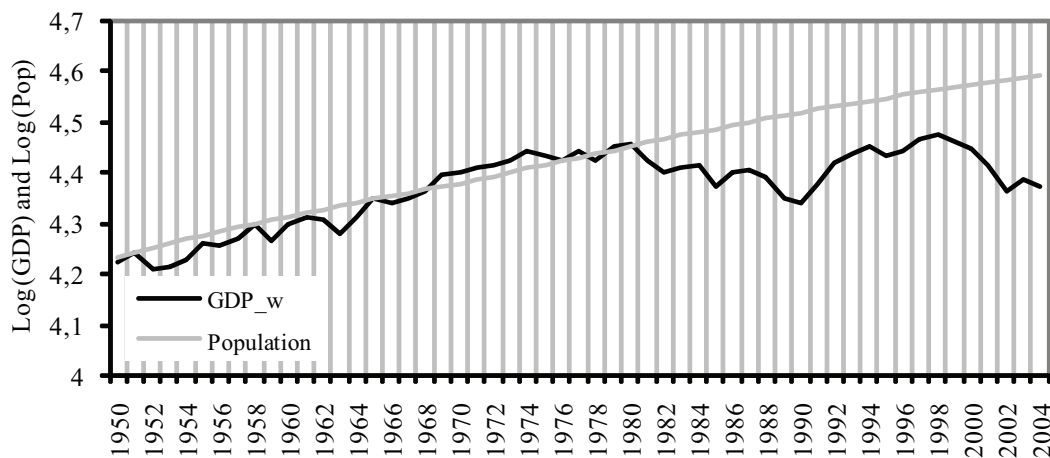
Although there were important vulnerabilities in each of these areas, the impact was very different in the Argentina's firms. Especially important was the size of the firm to overcome this crisis. In this situation is very important try to understand the link between entrepreneur's characteristics and firm size.

<sup>1</sup> When it suffered severe contagion from the so-called Tequila crisis.

The primary information upon which this research is based was collected during the period from April to September 2002, i.e. six months after the beginning of the most serious political and social crisis in Argentina's modern history (December 2001). In just one month (December 2001 – January 2002), President De La Rúa resigned, three new transition presidents came and went in quick succession, and the Argentine currency was formally devalued by 40%. This resulted in economic chaos and a real devaluation of the peso of over 200%, with the currency dropping from 1 peso = \$1 to almost 4 pesos per dollar.

This crisis worsened entrepreneurs' general distrust of Argentina's public institutions, which was already poor the previous year (2001) when, according to the Latinobarometro opinion survey, only 17% of the Argentine population had confidence in the Parliament or National Congress. Combined with the recession that had been worsening since 1998 (convertibility plan 1 peso = \$1), the result was an unstable business environment with a high level of uncertainty and hopelessness among small and medium-sized entrepreneurs. Figure 1 shows the evolution of GDP per worker in Argentina over more than 50 years.

As can be appreciated in Figure 1, the crisis is related to this paper's period of analysis (2001–2002).



**Fig. 1.** Real GDP per worker in Argentina from 1950 to 2004

The contribution of our study to the existing literature is twofold. First, quantile regression based on work by Mata (1996) is used as a more suitable methodology to measure the determinants of firm size. Second, the previous objective is carried out in a context of economic and social crisis where the lessons learned are even more important.

Our results show that the main sets of explanatory variables related to entrepreneurial characteristics (age, experience, education, and vocation) provide a full explanation of firm size. However, the group of variables related to the strategy continued by entrepreneurs or the environment was less representative.

The study is structured as follows. Section 2 examines previous empirical research and hypotheses. Section 3 discusses data, variables, and methodology. In Section 4, we discuss our empirical findings; and Section 5 draws conclusions and implications.

## **2. Literature review and hypothesis**

We can say that our work, on the characteristics of the entrepreneur in Argentina, joins other empirical studies conducted – in the last years - in other countries such as Mexico (Hernandez-Trillo *et al.* 2005; Heino 2006), USA (Kim *et al.* 2006; Goetz and Rupasingha 2009), Germany (Wagner 2007; Fossen 2009), Japan (Masuda 2006), Sweden (Nykvist 2008), Republic of Korea (Kang and Heshmati 2008), Irish (Bhaird and Lucey 2009), Italy (Bonaccorsi and Giannangeli 2008; Gagliardi 2009), Lithuania (Milius 2008), and The Netherlands (Koster 2009).

Recent works (Mesnard and Ravallion 2006; Buera 2009; Quadrini 2009; Jaimovich 2010) stress the need to include the entrepreneur's characteristics and others structural factors in the traditional models of economic development. In relation with entrepreneur's characteristics the literature considers different factors like: Age (Mondragón-Vélez 2009), Gender (Minniti and Nardone 2007; Startiene and Remeikiene 2008, Kobeissi 2010), Race (Fairlie and Robb 2007), Education (Backes-Gellner and Werner 2007; Van der Sluis *et al.* 2008), Risk Taking (Vereshchagina and Hopenhayn, 2009), etc. Relative to structural factors the literature has focused in: Liquidity Constraints (Oliveira and Fortunato 2006; Chapelle 2010), Credit Rationing (Blumberg and Lettierie 2008; Gagliardi 2009), Regulations (Capelleras *et al.* 2008), Institutional context (Henrekson and Johansson 1999; Bowen and De Clercq 2008; Nyström 2008), Local Knowledge and Innovation (Bae and Koo 2009; Braunerhjelm *et al.* 2010), etc.

In order to explain the firm growth and its determinants, this paper uses Storey's (1994) analytical framework as its main guide. This framework proposes three main factors that can be seen as a variety of different elements: resources and characteristics of the entrepreneur (individual), the firm (organizational), strategy and environment.

At the individual level, the entrepreneur's human capital is often seen as a good indicator of their likely success. Becker's (1964) theory of human capital extended micro-economic analysis to a wide range of human behaviors and suggested that knowledge can increase cognitive ability and lead to more effective activity. Many scholars have examined the influence of human capital within the process of entrepreneurship (Cooper *et al.* 1994; Honig 2001; Peña 2004) and the positive effect human capital has on firm growth (McPherson 1996; Roper 1999; Walsilczuk 2000; Almus 2002).

For instance, the positive effect of formal education on firm survival and growth has been extensively reported (e.g. Cooper *et al.* 1994; Gimeno *et al.* 1997; Peña 2004). Prior experience has also been shown to influence firm growth, and entrepreneurs with some managerial experience, normally in their previous job, are likely to form firms which grow faster than firms started by individuals without such experience (Stuart and Abetti 1990; Storey 1994).

However, there is no consensus about the influence of gender on growth (Fischer *et al.* 1993; Du Rietz and Henrekson 2000; Liedholm 2002). Several psychological traits and motivations have been found to influence firm growth (Roper 1999; Walsilczuk 2000; Baum *et al.* 2001; Sadler-Smith *et al.* 2001).

In order to examine how human capital and motivations affect the growth of SMEs, the following hypotheses will be tested:

**H1:** There will be a positive relationship between an individual's level of general human capital and firm size.

**H2:** There will be a positive relationship between entrepreneurial vocation and firm size.

Besides the characteristics related to entrepreneurs and firms, size also depends on the strategies employed by entrepreneurs themselves. In this respect, entrepreneurs consciously select strategies and their choices, at least in part, reflect their views on what the optimal strategy should be in a given environment. Porter (1980) identifies three broad business-level choices: cost leadership, differentiation, and focus. Focus refers to competitive strategies that target a particular set of customers for a product line, or geographical market. The low-cost strategy involves the construction of efficient-scale facilities, the aggressive pursuit of cost reduction in all functions of organizations. Differentiation strategies are designed to create and market innovative, high-quality products and/or services. The three competitive strategies are alternative, viable options to deal with the environmental forces, and to outperform firms that implement combined strategies. However, various authors suggest that strategy should be adapted to the environment (Tushman and Romanelli 1985; Sandberg and Hofer 1987). In this respect, McDougall *et al.* (1992) found that, with regard to small firm growth, broad strategies were more successful, thus questioning the otherwise common niche argument (Davidsson *et al.* 2005).

As Capelleras and Rabetino (2008) mentioned, and according to Storey (1994), there are other strategic variables, considered actions taken by the entrepreneur after start-up, which are likely to have an impact on growth. For example, the use of a formal business plan or strategic planning. Delmar and Shane (2003, 2004) argue that business planning is central to the organizational activities of new ventures and firm growth.

Finally, many external factors may influence firm growth, such as location-specific advantages, industry-specific factors, macroeconomic conditions, and public policies. Authors like Shane and Kolvereid (1995) found strategy to have little influence on firm growth, whereas variations in national environments accounts for almost all performance variation. In this context, the industry sector has been shown to be a significant variable when analyzing firm growth (Davidsson *et al.* 2002). Several scholars conclude that the more dynamic industries are, the more firm growth there is (Jovanovic 1982; Audretsch 1995; Carroll and Hannan 1989, 2000). The location of the firm was also considered to have a potential influence on firm growth.

However, evidence is not conclusive with respect to the effect firm location has on growth (Birley and Westhead 1990; Storey 1994; Davidsson *et al.* 2002).



In order to examine how strategy and environment affect the growth of SMEs, the following hypotheses will be tested:

**H3:** The specific definition levels of entrepreneurial strategy (in terms of competitive price and the knowledge of competitors' prices) have a significant influence on firm growth.

**H4:** Location and industry activity will be significant variables in explaining firm size.

### **3. Data, variables, and methodology**

#### **3.1. Data, variables, and descriptive statistics**

The determinants mentioned in earlier studies have led us to use two types of information sources together in this paper. One is of a primary nature, using the entrepreneur<sup>2</sup> as a unit of analysis, and the other is secondary, at the province level<sup>3</sup>. With respect to the sample selection for the primary analysis, as was mentioned above, we have considered firms located in 14 provinces in Argentina<sup>4</sup>, where the total number of firms is 360,709 (data referring to July 2002), the target population being firms with between 1 and 250 employees, representing 99.63% of all firms in Argentina. A total of 1,690 firms (0.36%) employ more than 250 workers.

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<sup>2</sup> In this case, we have designed a specific survey to collect information about the characteristics of the environment in which the entrepreneurs operate, as well as their attitudes and behavior with respect to the economy and the management of the company. The method employed was a personal survey using a questionnaire that was specially designed for our research and self-administered by the firms. The firms were located within the borders of Argentina and came from all economic sectors, with a workforce of between 1 and 250 employees (total population 448.497 firms). The sample unit was the entrepreneur or person designated by this figure, and from a planned sample of 2.300 firms of 1 to 249 employees, a real sample of 1.314 firms of under 250 employees was obtained.

The surveys were done by means of personal interviews to entrepreneurship realized by auxiliary teachers and university students advanced and coordinated by teachers in the following universities: Universidad Nacional de Salta, Universidad Nacional de Jujuy, Universidad Nacional de Tucumán, Universidad Nacional de Catamarca, Universidad Nacional de Santiago del Estero, Universidad Nacional de Buenos Aires, Universidad Nacional de Misiones, Universidad Nacional del Nordeste, Universidad Nacional de San Juan, Universidad Nacional de Córdoba, Universidad Nacional de Río Cuarto, Universidad Nacional de la Patagonia y Universidad Nacional del Comahue. The Association of National Teachers of General Administration (ADENAG) was the institution that helped in this project.

<sup>3</sup> Given the absence of official databases, we requested that the Center for Statistical Services – Special Works Division of the Argentine National Institute of Statistics and Census – generate a database that was specially designed for our research on the total population of companies in the formal sector of the Argentine economy. The content of the Report on Companies in Europe (Eurostat) was taken as its reference.

<sup>4</sup> The choice of this scope of analysis was motivated by our interest in studying one of what is considered an emerging region (in a particularly complex time period due to its substantial political and economic instability), in contrast to those other studies referred to above that center on regions.

The representativeness of the sample were determined by province (see Table 2). Representativeness by sector was 0.29% taking into consideration the total number of firms in the country (primary: 0.12; industrial: 0.4; construction: 0.25; and services: 0.31).

**Table 2.** Sample representativeness by province

		Firms	% of	Total	% of Total
No.	Province	Surveyed	Sample	Population	Population
1	San Juan	102	7.76	5204	1.96
2	Catamarca	110	8.37	1835	5.99
3	Tucuman	105	7.99	7565	1.39
4	Jujuy	110	8.37	3008	3.66
5	Salta	97	7.38	6303	1.54
6	Santiago del Estero	99	7.53	3204	3.09
7	Chaco	97	7.38	8312	1.16
8	Corrientes	95	7.23	5221	1.82
9	Chubut	92	7.00	6434	1.43
10	Cordoba	149	11.34	39315	0.38
11	Neuquen	40	3.04	4748	0.84
12	Rio Negro	53	4.03	6814	0.77
13	Misiones	96	7.31	6501	1.47
14	Buenos Aires	69	5.25	256245	0.02
	Totals	1314	100	360709	0.364

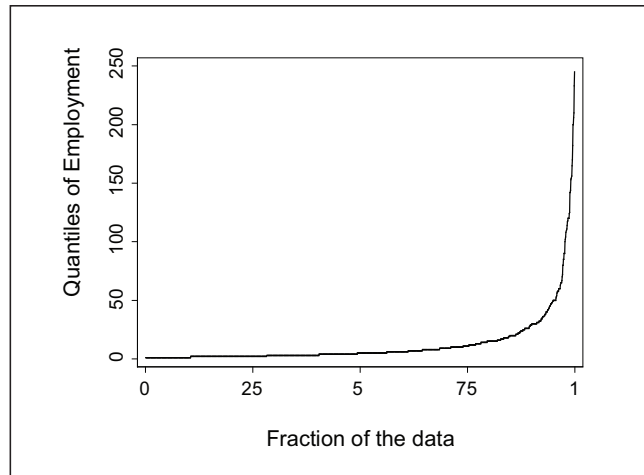
We understand firm employment growth to be a multidimensional and complex phenomenon. According to the literature review in the previous section, three sets of factors can be used to explain firm growth. Each of these components can be broken down into more detailed subset variables, which will be used in our empirical analysis. In this respect, firm growth ( $G$ ) can be explained by the human capital of the entrepreneur ( $HC$ ); the entrepreneur’s strategy behavior ( $ST$ ); as well as external factors or environmental influences ( $E_{Regions} + E_{Sector}$ ), where is a firm-specific stochastic variable that is independent across firms:

$$G = f(HC, ST, E_{regions} + E_{Sector}, \bar{u}). \tag{1}$$

As was previously mentioned (Delmar 1997; Weinzimmer *et al.* 1998; Wiklund 1998), a wide variety of different variable growth ( $G$ ) measures have been used in the literature, such sales and employment, or other more subjective measures of growth. We favor measuring employment for different reasons: i) In the Argentine context, it minimizes inflation, currency, and accounting problems; ii) We are interested in researching organic

employment growth because this represents genuine job creation and not simply growth through acquisition.

The size distribution of the sample is briefly described in Figure 2 and Table 3. The typical Latin-American firm is quite small.



**Fig. 2.** Firm size

**Table 3.** Firm size: Descriptive statistics

Mean	Standard deviation	Skewness	Kurtosis	Minimum	Lower quartile	Median	Upper	Maximum
12.567	24.979	4.930	32.793	1	2	5	142	245

It is clear that the size distribution of firms is highly skewed and that 50% of them employ no more than five people, though average firm size is about 12 people. The present distribution does not conform to the statistical distributions that have been suggested in the literature which underlie the firm size distribution. However, our data do not have a normal distribution and thus dependent variables were transformed into a logarithm.

The Shapiro-Wilk normality test computed for the log of the firm size distribution gives a Z statistic of 7.39 significant at 1%. The mean values of firm sample are: firm age = 16.5, entrepreneur age = 46.2, experience = 15.3 years, respectively. Males account for 75.27% of the total and 24.73% are female. With respect to their educational level, 35.02% of the entrepreneurs had university studies and 64.92% had others.

As was mentioned before, one of the relevant factors to understand managerial growth is knowing the type of actions carried out by entrepreneurship. To determine this, three questions associated to the strategic aspects were formulated. First, How often is the planning process carried out? (annually, quarterly, monthly, or none). Second, which competitive position does their company occupy with respect to their most direct competitors? (1 = very weak to 5 = very strong). Third, what is their cost strategy level with



respect to their most direct competitors? (1 = smaller, 2 = equal, 3 = larger, 4 = not known). Likewise, market expectations play an important role mainly on the manager's decisions which have a direct impact on company growth, given the conditions during the Argentinean crisis to which this paper refers. In this respect, besides controlling with dummy variables for county and sector, the manager was asked about his/her market estimate (1 = expansive, 2 = recessive, 3 = stable, 4 = not known). Finally, this section ends by presenting the descriptive statistics of the variables used which can be found below in Table 4.

**Table 4.** Quartile averages for key variables

	10th	25th	50th	75th	90th
Variables					
Age	43.21 (11.69)	44.63 (11.71)	44.86 (11.67)	48.20 (12.04)	48.84 (11.87)
Experience	12.07 (11.07)	13.58 (11.54)	13.91 (10.47)	16.36 (11.65)	18.66 (11.11)
Gender					
Male	33.33%	26.18%	28.53%	23.90%	16.36%
Female	66.67%	73.82%	71.47%	76.10%	83.84%
Vocation					
No	19.57%	21.46%	11.96%	13.55%	8.33%
Yes	80.43%	78.54%	88.04%	86.45%	91.67%
Education					
University studies	31.16%	25.75%	28.53%	38.65%	48.15%
Others	68.84%	74.25%	71.47%	61.35%	51.85%
Family firm					
No	62.32%	44.64%	44.23%	46.22%	46.91%
Yes	37.68%	55.36%	55.77%	53.78%	53.09%
Business Plan					
No	26.09%	26.19%	30.43%	26.30%	45.06%
Yes	73.91%	73.82%	69.57%	73.7%	54.94%
Competitive position					
Strong or very strong	26.08%	24.47%	28.81%	30.28%	40.44%
Critical, weak, average	73.92%	75.53%	71.19%	69.72%	59.56%
Market estimate					
Expansive or stable	42.03%	38.2%	46.47%	47.41%	55.56%
Recessive or not known	57.97%	61.8%	53.53%	52.59%	44.44%

### 3.2. Model

In this section, the model that will be used in this paper is presented. The model is developed along the lines of small business economic theory (see, for example, Evans

1987; Jovanovic 1982). According to Basu and Goswami (1999), for the purposes of statistical analysis, Equation (1) can be transformed into a double log linear specification as follows:

$$\text{Log } y_i = \alpha + \beta' x_{is} + \mu_{is} \quad (2)$$

and  $y_i = y_i^{1/t}$ , where  $y_i$  refers to the  $i$ th firm's sales for period  $t$  and  $x_{is}$  is a previously mentioned vector of variables [the human capital of the entrepreneur (HC); the entrepreneur's strategy behavior (ST); external factors or environmental influences ( $E_{\text{Regions}} + E_{\text{Sector}}$ )].

$$\begin{aligned} \text{LNY}_i = & \alpha + \beta_1 \text{LNAGE} + \beta_2 \text{LNEXPER} + \beta_3 (\text{LNAGE} * \text{LNEXPER}) + \beta_4 \text{GENDER} + \\ & \beta_5 \text{VOCATION} + \beta_6 \text{EDUCATION} + \beta_7 \text{FIRMP} + \sum_{i=1}^4 \beta_8 \text{BPLAN} + \sum_{j=1}^5 \beta_9 \text{CPOSITION} + \\ & \sum_{k=1}^4 \beta_{10} \text{STRATEGY} + \sum_{l=1}^4 \beta_{11} \text{MARKET} + \sum_{m=1}^{14} \beta_{12} \text{LOCATION} + \sum_{i=1}^4 \beta_{13} \text{SECTORS} + \varepsilon_{is} \end{aligned}$$

The empirical model specified in Equation (2) is estimated using the Regression Quantiles (RQ) estimator as was introduced by Koenker and Bassett (1978, 1982). Quantile regression allows the effects of independent variables  $x_{is}$  to be quantified at different points along the conditional distribution of the dependent variable  $y_i$ . Assuming that the distribution function  $F$  of  $y$  is continuous, this is the  $\theta$ th quantile ( $0 \leq \theta \leq 1$ ), and  $\Psi_\theta$  is the value at which  $P(y < \Psi_\theta) = F(\Psi_\theta) = \theta$ . While OLS measures the effect of explanatory variables on the conditional mean of  $y$ , quantile regression measures the effect at any point along the conditional distribution, for example at the 50<sup>th</sup> percentile (i.e., median), 75<sup>th</sup> percentile, etc.

Mata and Machado (1996) point out a number of advantages of using the RQ estimator instead of standard least square regression models. According to Görg and Strobl (2002), one of the advantages is that RQ enables different slope parameters to be estimated at different quantiles along the conditional distribution of the dependent variable. This may prove particularly valuable when estimating the effect of industry covariates on the start-up size of firms, where one may expect, for example, small firms (or entrants) to be affected differently by, say, minimum efficient scale (MES) than large firms. This should then be reflected in differences in the coefficients on the MES for the low and high quantiles of the conditional distribution for start-up size.

There are also disadvantages associated with the RQ estimator. Probably the main problem is that only asymptotic of the estimators are known, which raises the issue of how parameters behave in finite samples. This may not be too problematic in our case since we have a large sample. Though estimating quantile regressions is computationally

demanding, this problem was less so because of the availability of powerful computers and software programs such as Stata 9.0 which allow estimates to be performed relatively easily.

#### **4. Empirical findings**

The results of estimating Equation (2) for two models in which region variables are included where the company is located in Model 1 and GDP in Model 2 are reported in Table 5. For both models, the results for five different quantiles of the size distribution are reported, namely for the 0.1, 0.25, 0.5 (i.e. median), 0.75, and the 0.9 quantiles. Our choice of the lowest and highest quantiles, i.e., 0.10 and 0.90, was dictated by the nature of our data set.

Generally, an investigation of Table 4 reveals that there are statically significant differences in the coefficients between and among the various quantile regression estimates for most independent variables<sup>5</sup>. Specifically, it can be seen that the coefficients of the variables are linked to the founder of the company. The coefficients of age, experience, and the age\*experience interaction varies significantly from 0.034 to –0.281, 0.042 to –0.779, and –0.010 to 0.132, respectively among quantiles. In this respect, in the 0.1 and 0.25 quantiles, as the manager's experience and age increases, firm growth increases, although the effects that a combination of age and experience have are negative. That is to say that the effects of these two variables help the firm grow until the limits of age and experience are reached, with a subsequent decline in growth.

However, in the 0.5 to 0.9 quantiles, the initial effects of age and experience maintain an inverse relationship with growth, though the combined effect of age and experience produces a positive relationship. That is to say that starting at a limit, age and experience play a relevant role affecting firm size. The gender variable is significant in the 0.75 and 0.9 quantiles, indicating that firms created/managed by women are smaller. As was expected, managers with university studies and a larger vocation experience more growth than those who do not possess these characteristics. Family firms have lower levels of growth linked to the inferior quantile. These results allow us to accept hypotheses H1 and H2, therefore affirming that a positive relationship exists between company size, human capital, and entrepreneur vocation.

However, the strategic factors that seek to capture entrepreneurial behavior indicate that entrepreneurs who plan their decisions are connected with companies of a larger size than those who do not plan. This result is shown as statistically significant for all quantiles. Likewise, there are no statistically significant differences for the planning periods.

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<sup>5</sup> To further evaluate the importance of the differences in the quantile parameter estimates presented in Table 4, we tested the equality of coefficients for any two quantiles as well as jointly for all quantiles. The tests were performed using the F-statistic. The results confirm the importance of the variables related to human capital, showing a major significance for most of the contrasts among quantiles (seven contrasts), with the exception of the comparison between the 0.1–0.25 and 0.75–0.9 quantiles (two contrasts). (The results were not included to save space.)

Table 5. Estimation results of firm size

	Model 1						Model 2					
	0.1	0.25	0.5	0.75	0.9		0.1	0.25	0.5	0.75	0.9	
Variables												
Constant	-0.114***	-0.278***	0.807***	1.733	2.642***		-0.146***	-0.281***	0.778***	1.427***	3.070***	
	0.056	0.102	0.106	0.233	0.465		0.050	0.103	0.106	0.214	0.326	
Entrepreneurial characteristics												
Lnage	0.034**	0.103***	-0.123***	-0.281***	-0.259**		0.036***	0.109***	-0.110***	-0.151***	-0.321**	
	0.015	0.027	0.028	0.069	0.127		0.013	0.027	0.028	0.057	0.088	
Lnexperience	0.042*	0.094**	-0.322***	-0.676***	-0.779***		0.057**	0.100***	-0.298***	-0.494***	-0.855***	
	0.024	0.040	0.042	0.090	0.188		0.022	0.041	0.042	0.084	0.138	
Lnage*Lnexperience	-0.010*	-0.031***	0.059***	0.131***	0.132***		-0.014**	-0.033***	0.054***	0.082***	0.154***	
	0.006	0.010	0.011	0.023	0.048		0.006	0.011	0.011	0.022	0.035	
Gender (male=1)	-0.002	-0.009	-0.011	-0.034**	-0.065**		0.001	-0.009	-0.013*	-0.041**	-0.068**	
	0.004	0.006	0.007	0.015	0.032		0.004	0.007	0.007	0.015	0.023	
Vocation (with vocation = 1)	-0.002	0.003	0.019***	0.034*	0.067*		-0.002	0.002	0.021***	0.037***	0.071***	
	0.005	0.008	0.009	0.019	0.037		0.005	0.009	0.009	0.018	0.027	
Education (university studies = 1)	0.006	0.014**	0.015***	0.022	0.036		0.005	0.014**	0.014**	0.021*	0.042***	
	0.004	0.006	0.006	0.014	0.028		0.004	0.006	0.007	0.013	0.019	

Continued Table 5

Family firm ( <i>family</i> = 1)	-0.012***	-0.008	-0.006	-0.005	-0.006	-0.014***	-0.013**	-0.009	-0.002	-0.016
Strategy	0.004	0.006	0.006	0.013	0.026	0.004	0.006	0.006	0.012	0.019
Business plan (four categories)										
Quarterly	0.005	-0.005	-0.001	-0.056**	-0.075	-0.007	-0.002	0.002	-0.055**	-0.084***
Monthly	0.008	0.012	0.013	0.027	0.055	0.007	0.012	0.013	0.025	0.038
Improvised	-0.0005	-0.007	-0.005	-0.039	-0.043	-0.018***	-0.015	0.005	-0.054***	-0.062*
	0.007	0.011	0.011	0.024	0.051	0.006	0.011	0.012	0.023	0.035
	-0.015***	-0.015*	-0.028***	-0.076***	-0.122***	-0.026***	-0.025***	-0.024***	-0.089***	-0.108***
	0.006	0.009	0.009	0.020	0.042	0.005	0.009	0.010	0.019	0.029
Competitive position (five categories)										
Weak	0.012*	0.011	0.008	0.014	0.016	0.015***	0.011	0.014	0.016	0.029
Average	0.007	0.011	0.012	0.025	0.048	0.006	0.011	0.012	0.023	0.036
Strong	0.013**	0.016*	0.018	0.013	0.007	0.019***	0.016*	0.021**	0.016	0.011
Very strong	0.006	0.009	0.010	0.020	0.041	0.005	0.009	0.010	0.019	0.030
	0.014**	0.008	0.006	-0.005	0.011	0.017***	0.008	0.012	0.017	0.015
	0.006	0.010	0.011	0.023	0.046	0.006	0.010	0.011	0.021	0.033
	0.034***	0.011	0.020	-0.001	-0.084	0.049***	0.011	0.035	0.039	-0.064
	0.012	0.023	0.025	0.052	0.106	0.013	0.023	0.025	0.047	0.060





Continued Table 5

	0.009	0.015	0.016	0.033	0.048					
Tucuman	-0.003	-0.007	0.02	0.054	0.007					
	0.010	0.014	0.015	0.033	0.041					
Jujuy	-0.012	-0.001	0.002	-0.001	0.011					
	0.010	0.014	0.015	0.032	0.046					
Salta	0.038***	0.055***	0.092***	0.156***	-0.084					
	0.01	0.015	0.016	0.032	0.106					
Santiago del Estero	0.011	0.027*	0.040***	0.070**	-0.014					
	0.011	0.016	0.017	0.036	0.070					
Chaco	-0.014	-0.009	0.011	0.033	0.010					
	0.009	0.015	0.015	0.033	0.064					
Corrientes	-0.0008	-0.011	0.009	0.030	-0.074					
	0.01	0.015	0.016	0.033	0.063					
Chubut	0.013	0.008	0.008	0.024	0.099					
	0.010	0.015	0.016	0.032	0.067					
Cordoba	0.003	0.003	0.026*	0.059***	0.016					
	0.009	0.014	0.014	0.03	0.079					
Neuquen	0.026**	0.036*	0.025	0.017	0.005					
	0.013	0.02	0.021	0.043	0.065					
Rio Negro	0.015	0.01	0.006	-0.002	0.010					

Continued Table 5

	0.012	0.017	0.019	0.039	0.070								
Misiones	0.002	0.006	-0.0005	0.065**	-0.065								
Buenos Aires	0.011	0.015	0.016	0.033	0.067								
	0.006	0.008	0.028	0.043	0.174**								
	0.011	0.017	0.017	0.036	0.075								
<b>Sectors (four categories)</b>													
D_Industrial	0.012	0.018	0.015	0.027	-0.027	0.016***	0.018	0.005	-0.002	-0.006			
	0.009	0.015	0.015	0.031	0.060	0.008	0.015	0.015	0.030	0.047			
D_Construction	0.031**	0.023	0.022	0.018	-0.050	0.035***	0.023	0.011	-0.017	-0.010			
	0.013	0.021	0.022	0.046	0.090	0.011	0.021	0.022	0.042	0.066			
D_Services	-0.007	-0.0009	-0.003	0.004	0.052	-0.003	-0.0009	-0.023*	-0.012	0.066			
	0.008	0.013	0.014	0.028	0.055	0.007	0.013	0.014	0.027	0.043			
F( $\beta_i = 0$ )	2.91**	16.79***	259.56***	183.50***	88.16***	9.17***	16.79***	14.67***	17.15***	10.52***			
F(equality)		4.59***	21.74***	12.63***	5.20***		4.59***	24.18***	13.24***	5.67***			
No. observations	1302	1302	1302	1302	1302	1302	1302	1302	1302	1302			

Note: Standard errors in the second line of each value of the estimated coefficient. \*\*\*, \*\*, \* represent significance at 1%, 5%, and 10%, respectively. Omitted group: males, no vocation, without university studies, non-family firm, annual planning, very weak competitive position, smaller levels of costs, expansive market, county of San Juan, agriculture sector.

Similarly, managers who manifest to be in an unfavorable competitive position run companies of a smaller size. However, when they respond to the question regarding their cost strategy with respect to the competition, the managers that indicated having smaller cost levels are connected with larger companies compared to the rest. This fact is reflected in the superior quantile (0.9). These results allow us to accept hypothesis H3 although statistical significance is not shown in all quantiles. The results reported in Table 4 are not as conclusive as those with reference to human capital.

The explanatory factors of the environment do not have the same importance as those relative to the human capital of entrepreneurs. As is shown in the results for Model 1 (Table 5), only in the .75 quantile is it reflected that entrepreneurs who perceive market expectations in an expansionary way run larger firms compared to those with recessive market expectations or who do not know how it will evolve. The companies located in the counties of Salta, Cordoba, Neuquen, Misiones, and Buenos Aires are larger than companies in San Juan. There are no statistically significant differences with the rest of the counties. Finally, it should be said that there are no significant differences at the sectoral level.

With respect to Model 2, we observe the same behavior with regard to the variables that measure entrepreneurial characteristics and strategic behavior. The connection with LnGDP, the negative coefficients, which is statistically significant at the 95% level, could suggest that the economic situation in Argentinean firms as perceived by entrepreneurs improves as GDP declines in the 0.9 quantile, and vice versa in the 0.1 quantile. These results make it necessary to reject hypothesis H4.

In sum, the determinant of firm size depends on entrepreneurs' general and specific human capital and vocation as Becker (1964), Cressy and Storey (1995), and Cooper (1981) have suggested. However, although strategic factors and environment have had relative importance, they were not as significant as those relative to entrepreneurship. In this respect, authors like Mata and Machado (1996) and Görg *et al.* (2000) indicate the importance of industry characteristics in the determination of size.

## **5. Conclusions**

Four primary hypotheses are tested in this paper: a) Is the general and specific human capital of the entrepreneur positively related to firm size? b) Is the vocation of the entrepreneur positively related to firm size? c) Does the specific definition level of the entrepreneur's strategy (in terms of competitive price, knowledge of competitors' price) have an important influence on firm size? and d) Can location and type of industry be used as significant variables to explain firm size?

A sample of 1314 firms in the manufacturing, agriculture, construction, and service sectors operating in Argentina in 2002 was used. The empirical answers provided by our analysis support the theoretical proposition that the higher the degree of general and specific Human this strongly related with the size of the firm. This result is related to those reached by Mata (1996) and Almus (2002). A positive effect of education on firm size has been extensively reported (Cooper *et al.* 1994; Burke *et al.* 2002). Personality

theories point to the importance of personal predispositions for venture success. In this context, a number of traits and motives of successful entrepreneurs have been identified, but these concepts have typically produced weak relationships with venture performance (Baum *et al.* 2001). However, our results were able to confirm the positive influence of motivation on firm size.

From a strategic point of view, we have been able to see the importance that planning has on the resources of a company as well as on its strategic behavior, concluding that larger firms are connected with entrepreneurs who carry out an annual planning process compared to those who do not plan. We have also found evidence that a better competitive situation and knowledge of the competition is connected with larger. This result is interesting because competitive strategies reflect the choices of managers. Thus, the determinants of individual decision making and behavior are among the determinants of strategy because people choose plans in part on the basis of: a) what they are predisposed to do, b) what they are motivated to do, and c) what they think they can do (Bandura 1986; Hollenbeck and Whitener 1988).

As was mentioned earlier, the explanatory factors of the environment have not had the same importance as those concerning the human capital of entrepreneurs. The relatively low impact of the environmental domain on firm size (market estimate, location, sectors) is perhaps surprising. Although other studies have found similar results in this direction, such as Baum *et al.* (2001). In our case, a possible explanation could be derived from the widespread crisis that existed during the period of analysis. However, De Jorge *et al.* (2007) indicated differences in regional dynamism as well as the relevant heterogeneity of the typology of different entrepreneurs in Argentina. In this respect, future research should explore the role played by environment on firm size and subsequent growth. It is also necessary to use longitudinal data for firms in order to monitor their employment change. Efforts should be made to further study the growth of new firms using data sets that are as comparable as possible across different countries in Latin America.

In terms of policy implications, these findings show that generic public programs may not be the best way to increase the firm's competitiveness. It would be better to design intervention strategies targeted toward specific characteristics of firms. In the context of the Latin American countries this is much more important since usually there is a tendency to generate general incentive policies – at the sector or regional level - that do not take into account the specific characteristics of the firms<sup>6</sup>.

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<sup>6</sup> The OECD (2001) provides a framework allowing policy-makers to identify strong and weak points in their country's business environment. This report concludes that four micro-drivers (human capital, information and communications technology, innovation and entrepreneurship) are key drivers of performance and economic growth.

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## **ĮMONĖS DYDIS IR VERSLUMO VERTINIMAI: ARGENTINOS MAŽŲ IR VIDUTINIŲ ĮMONIŲ TYRIMO REZULTATAI**

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### Santrauka

Straipsnyje nagrinėjami įmonės dydį lemiantys veiksniai. Duomenys buvo renkami apklausiant 1314 įmonių Argentinoje, pasitelkus struktūruotą anketą, kuri buvo pildoma apklausos metu. Įmonės dydį lemiantiems veiksniams įvertinti buvo pritaikyta regresinė analizė. Rezultatai parodė, kad pagrindinis aiškinamųjų kintamųjų rinkinys, susijęs su steigėjo charakteristikomis (amžiumi, patirtimi, išsilavinimu ir profesija), lemia įmonės dydį. Rasta įrodymų, kad aukšto lygio strateginis planavimas ir geresnė konkurencinė pozicija turi tiesioginį ryšį su įmonės dydžiu. Aplinkos veiksniai pasirodė esą ne tokie reprezentatyvūs.

**Reikšminiai žodžiai:** augimas, įmonės dydis, vadovo savybės, regioninė plėtra.

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